# 2000
# KANSAS WATER QUALITY ASSESSMENT
# (305(b) REPORT)

## March 31, 2000

**Kansas Department of Health and Environment**
**Division of Environment**
**Bureau of Environmental Field Services**
**Forbes Field, Building 283**
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## PART I: EXECUTIVE SUMMARY/OVERVIEW

This report, the *2000Kansas Water Quality Assessment*, also known as the 305(b) Report, is the biennial assessment of the state's surface water quality as required by 33 USC 466 *et seq ,* the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act. The guidance by U. S. Environmental Protection Agency (EPA) for the preparation of this report provided three options for reporting. The Kansas Department of Health and Environment (KDHE) elected the second option which is to provide in even years, an electronic report accompanied by an abbreviated narrative report. The abbreviated narrative report contains only the information required by law that has **changed** from the last report (1998 Kansas Water Quality Assessment (305(b) Report), April 1998) and a simple reference to that report.

The Kansas Department of Health and Environment assessed the water quality for the period of 1998 -1999, of 18,236 miles of streams, all of which were considered monitored. This report represents an increase assessment of 2,616 miles from the 1998 305(b) Report. This increase in assessed miles is due to: 1) differences in mileage associated with rotational sites, and 2) increased monitoring in the Marais des Cygnes and Missouri River Basin in support of the establishment of Total Maximum Daily Loadings (TMDLs). A total of 188,508 lake acres were assessed. Of these, 175,454 acres were monitored and the conditions of an additional 13,052 lake acres were evaluated using best professional judgement.

The *2000 Kansas Water Quality Assessment Report* includes two years of data (1998-1999) and only acute aquatic life use support application. This assessment is consistent with the 1998 US EPA guidance and reflects the manner in which most states have prepared past 305(b) reports. The assessments contained in this report are consistent with the application of the numeric 1999 Kansas surface water quality standards with the exception of total suspended solids where a basin summary is included for streams for the two year period.

The major causes of nonsupport for streams, in order of prevalence, are pathogen indicators (fecal coliform), organic enrichment, sulfates, chlorides, and metals. The major causes for lake impairments were sediments, turbidity, nutrients/eutrophication, and taste and odor problems

Sources responsible for widespread pollutant loadings and beneficial use impairments of streams include agriculture (nonirrigated and irrigated crop production, and intensive animal feeding operations), natural sources, habitat modification, municipal point sources, and groundwater withdrawal. Major sources for lake impairment included natural sources and agriculture.

Of the assessed lake acreage in Kansas, 53% were stable over time, while slightly more than 27% appeared to be undergoing measurable eutrophication over time. Almost twelve percent of total lake acres showed appreciable improvement in trophic state condition during this reporting cycle. Municipal point sources, natural sources, and agriculture were the primary contributing factors to lake eutrophication.

The changes from the 1998 305(b) Report in the cumulative mileage rated as partially and fully supporting may be attributable to random fluctuations in climatological conditions. Specifically, increased rainfall and/or the number of rainfall events may have intensified nonpoint source impacts on water quality. Other variables may include application of total recoverable metal criteria throughout the entire state and the change in rotational sites assessed during this

reporting period. Because of the use of rotational site no comparison can be made with the 1998 305(b) Report.

High nitrate concentrations accounted for about 76% of the documented exceedences of the federal drinking water maximum contaminant levels (MCLs) during 1997 and 1999 for the groundwater monitoring network. The majority of the samples with excessive levels of nitrate were obtained from shallow wells (less than 100 feet) or in wells located in areas of sandy soil and high water tables. Other isolated concerns of groundwater contamination included the presence of volatile organic compounds, heavy metals, petroleum products and/or bacteria. The major sources of these contaminants included active industrial facilities, spills, leaking storage tanks, mineral extraction activities, and agricultural activities.

In Kansas, approximately 68% of public water supplies use groundwater as their only source of water. Five percent of public water supplies use a combination of groundwater and surface water. The majority of MCL violations of public water supplies were due to high levels of bacteria and nitrate. The bacteria exceedences observed are not considered to be reflective of ambient groundwater.

The imposition of more stringent permits limits and the resulting upgrades of municipal and industrial wastewater treatment facilities continue to result in notable improvements in surface water quality. As the number of point sources causing or contributing to significant water quality impairments continues to decline, future attention will necessarily shift to the remaining sources, primarily nonpoint source related water quality problems. It is anticipated that watershed pollution control efforts, predicated on the development of TMDLs and on the allocation of allowable pollutant loadings among point, nonpoint, and natural sources, will play an increasingly important role in the abatement of surface water pollution and improvement in water quality in Kansas. By June 30, 2000 Kansas will have established TMDLs for 48% of the waterbodies listed in the 1998 Kansas 303(d) List.

## PART II: BACKGROUND

Updated data are provided in the tables that follow. There are no significant changes since the 1998 305(b) Report, April, 1998.



There are no significant changes in state concerns and recommendations from the 1996 305(b) Report.

### Table 1. Kansas Atlas

| TOPIC | VALUE |
|---|---|
| State population | 2,554,047 |
| State surface area in square miles | 81,778 |
| Number of major river basins | 12 |
| Total number of interior stream miles (EPA RF3/DLG) | 134,338 |
| Number of border stream miles | 120 |
| Number of perennial stream miles | 23,731 |
| Number of intermittent stream miles | 110,225 |
| Number of ditch and canal miles | 382 |
| Number of lakes/reservoirs/ponds (publicly owned) | 317 |
| Acres of lakes/reservoirs/ponds (publicly owned) | 188,506 |
| Acres of public freshwater wetlands | 35,607 |

**Table 2. Number of Active KWPC and NPDES Permits***

| NUMBER OF PERMITTED FACILITIES | | | | | |
|---|---|---|---|---|---|
| **Municipal and Commercial** | | **Industrial/Federal** | | **Agricultural** | |
| Total Municipal and Commercial KWPC (non-overflowing) | 442 | Total Industrial/ Federal KWPC (non-overflowing) | 123 | Agricultural NPDES | 358 |
| Discharging Lagoons | 332 | Total Industrial (discharging) | 324 | Agricultural State | 1,385 |
| Mechanical Treatment Facilities | 172 | Pretreatment | 51 | Agricultural Certifications | 1,285 |
| **Total** | **946** | | **498** | | **3,001** |

KWPC = Kansas Water Pollution Control * as of January 1, 2000
NPDES = National Pollutant Discharge Elimination System

**Table 3. Permit Compliance Record.** "Absolute" Compliance* for WWTFs Excluding Non-Discharging Lagoons.

| YEAR | TYPE OF FACILITY | |
|---|---|---|
| | **MUNICIPAL & COMMERCIAL** | **INDUSTRIAL** |
| 1997 | 87% | 95% |
| 1998 | 86% | 91% |
| **TOTAL NUMBER** | **504** | **324** |

WWTF = Wastewater Treatment Facility
NA = not available
*Absolute compliance means that the facility reported all parameters required by the permit and met all permit limits for the monitoring period.

**Table 4. Summary of Local Environmental Code Adoption Through 1999**

| STATUS | NUMBER |
|---|---|
| Adopted and Being Administered | 100 |
| Approved for Adoption | 1 |
| Being Developed | 2 |
| No Action | 2 |

**Table 5. KDHE Cooperative Funding for Construction of Municipal Wastewater Treatment Facility Upgrades and Expansions.** Monetary units given in millions of dollars.

| FEDERAL FUNDING YEAR (FFY) | KWPCRF* | | CDBG** | | RD*** |
|---|---|---|---|---|---|
| | BASIC | LEVERAGED | FEDERAL | TOTAL | FEDERAL |
| 1998 | 21.218 | 51.077 | 4.789 | 5.134 | 6.500 |
| 1999 | 22.404 | 0 | 4.484 | 6.176 | 4.579 |
| **Total** | **73.622** | **51.077** | **9.273** | **11.310** | **11.079** |

* KWPCRF= Kansas Water Pollution Control Revolving Fund

** CDBG = Community Development Block Grant

*** RD = Rural Development

## PART III: SURFACE WATER ASSESSMENT

The KDHE maintains five primary water quality monitoring programs. These address (1) the chemical and physical properties of streams and rivers, (2) the biological properties of streams and rivers, with emphasis on aquatic and semiaquatic macroinvertebrate communities, (3) the physiochemical and biological properties of lakes and wetlands, (4) contaminant concentrations in the tissues of bottom-feeding fish, and (5) the physiochemical properties of groundwater. There have been no significant changes in the monitoring programs from those described in the 1998 305(b) Report except in the case of the Groundwater Monitoring Network (see Part IV). The current Section 106 monitoring strategy has not changed since the last Report, and therefore, is not included here. The accompanying maps delineate the sampling sites used for this report.

Figure 1. Stream Chemistry Monitoring Network
Figure 2. Biological Monitoring Network
Figure 3. Lakes and Wetland Monitoring Network
Figure 4. Fish Tissue Monitoring Network
Figure 5. Groundwater Monitoring Network

The assessments of streams and rivers were conducted as for the 1998 305(b) Report with the exception of the data from the Biological Monitoring Program, a description of which follows below. The data assessed for the ambient chemistry stream monitoring were collected during the calendar years 1998 and 1999. The assessments were based upon designated uses in the 1999 Kansas surface water quality standards (K.A.R. 28-16-28b through K.A.R. 28-16-28f) and utilized the numeric criteria stated in those standards. The 2000 assessment addresses only acute criteria for aquatic life support use with the exception of chloride. The ambient stream chemistry sampling data consists of grab samples taken, for the most part, every two months and do not lend themselves to chronic assessments based on a 7-day or 30-day averaging periods. Kansas has a narrative criterion for total suspended solids (TSS)(K.A.R. 28-16-28e(c)(2)(D)). Assessments for TSS were summarized basin-wide and the data are presented in Appendix A.

The assessment method for the data from the stream Biological Monitoring Program has been modified as follows:

The most recent five year period of record data were used (1994-1998) rather than the former two year period of record. Evaluations were based on the five year 75$^{th}$ percentile Macroinvertebrate Biotic Index (MBI) and Kansas Biotic Index (nutrients and oxygen demanding pollutants) (KBI-NO) scores rather than two year means. It is believed that manifestations of the effects of pollution on macroinvertebrate communities are often associated with episodic low flows and that more consistent aquatic life use attainment ratings will result from this modification.

The MBI scale remains the same, the KBI-NO scale is as follows:

Non Support KBI-NO $\geq$ 3.00
Partial Support 2.99 to 2.61
Full Support $\leq$ 2.60

The Ephemeroptera, Plecoptera, and Trichoptera Index (EPT) 25$^{th}$ percentile rank as well as historical trends in the metrics and historical aquatic life use support (ALUS ) ratings were also considered in the assignment of the 1994-1998 ALUS rating for the 2000 305(b) Report.

Causes and sources were based on knowledge of the presence or absence of point sources, point source performance and dominant land use in the watershed and near sampling stations. Best professional judgement was applied considering the qualitative manifestations of pollutant effects.

Overall flow chart of the decision process for assessment of ambient stream data are included as Appendix B.

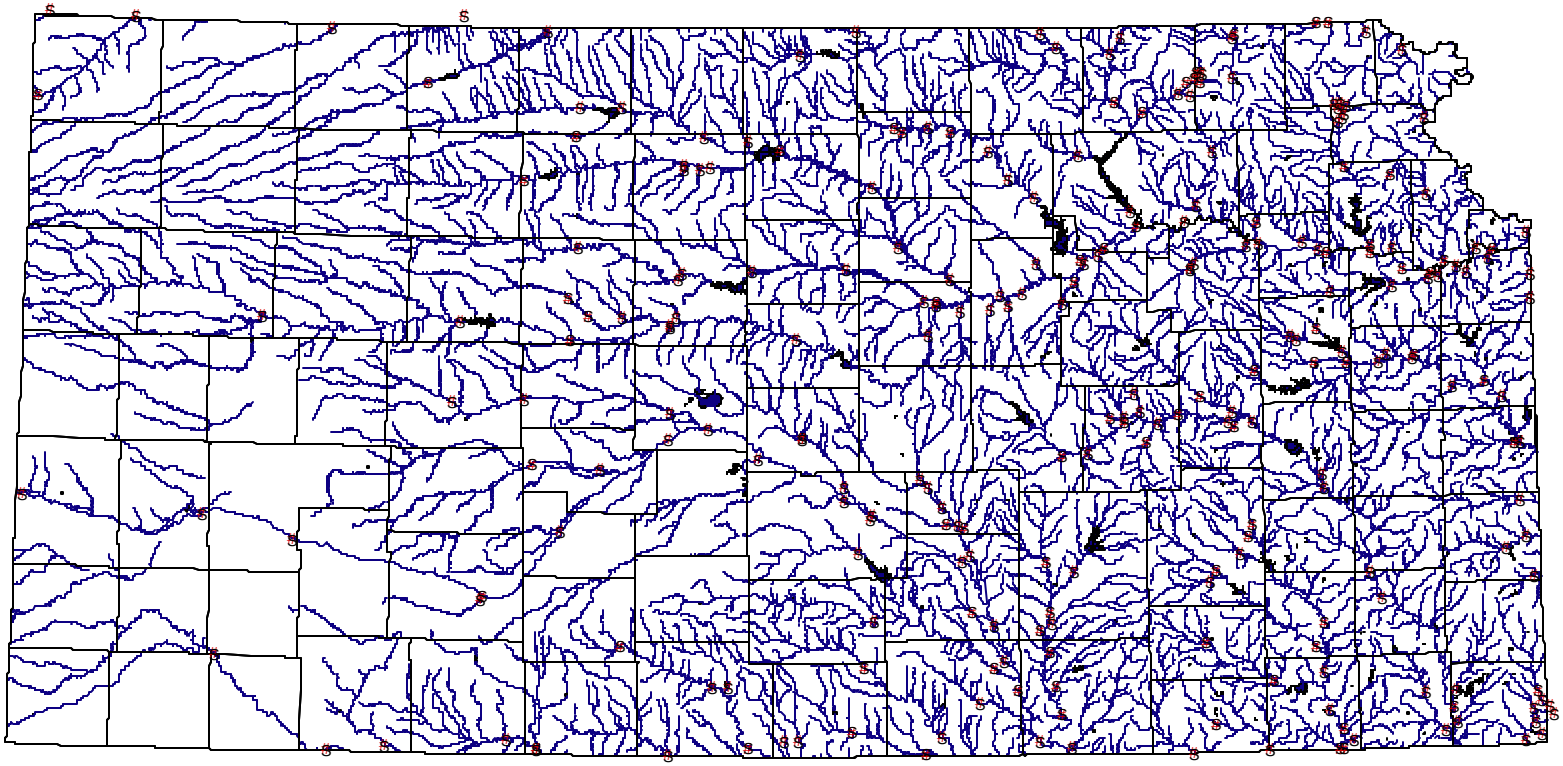
Summary tables, although not required, have been provided as follows:

| | |
|---|---|
| Table 6a. | Summary of Fully Supporting, Threatened and Impaired Stream Miles |
| Table 6b. | Summary of Fully Supporting, Threatened, and Impaired Lakes (in acres) |
| Table 7a. | Individual Use Support Summary for Streams |
| Table 7b. | Individual Use Support Summary for Lakes |
| Table 8a. | Total Stream Mileage Impaired by Various Cause Categories |
| Table 8b. | Total Lake Acres Impaired by Various Cause Categories |
| Table 9a. | Total Stream Mileage Impaired by Various Source Categories |
| Table 9b. | Total Lake Acres Impaired by Various Source Categories |
| Table 10. | Trophic Status of Lakes Assessed During This Reporting Cycle |
| Table 11. | Trophic State Trends in Lakes |
| Table 12. | Summary of Domestic Water Supply Use Impairments in Streams |
| Table 13. | Summary of Domestic Water Supply Use Impairments in Lakes |

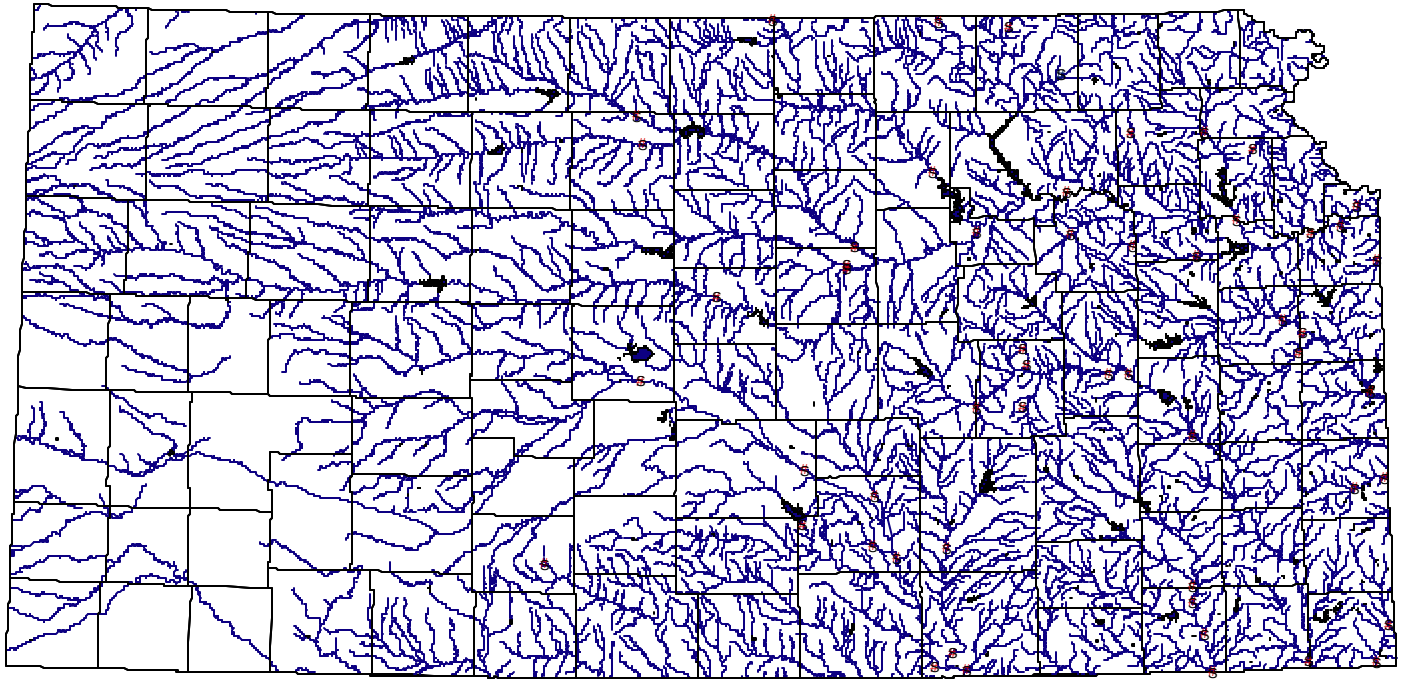
This report shows an increase from the 1998 305(b) Report of 2,616 in assessed stream miles. This increase is due to: 1) differences in mileage associated with rotational sites, and 2) increased monitoring in the Marais des Cygnes and Missouri River Basin in support of the establishment of TMDLs. The changes from the 1998 305(b) Report in the cumulative mileage rated as partially and fully supporting may be attributable to random fluctuations in climatological conditions. Specifically, increased rainfall and/or the number of rainfall events may have intensified nonpoint source impacts on water quality. Other variables may include application of total recoverable metal criteria throughout the entire state and the change in rotational sites assessed during this reporting period. Because of this, comparison with previous reports should not be made.

In compliance with Section 314(a)(2) of the Clean Water Act, an assessment report of lake water quality is presented in Appendix C.

## FIGURE 1. STREAM CHEMISTRY MONITORING NETWORK 1998 -1999



## FIGURE 2. STREAM BIOLOGICAL MONITORING NETWORK
## 1994 - 1998



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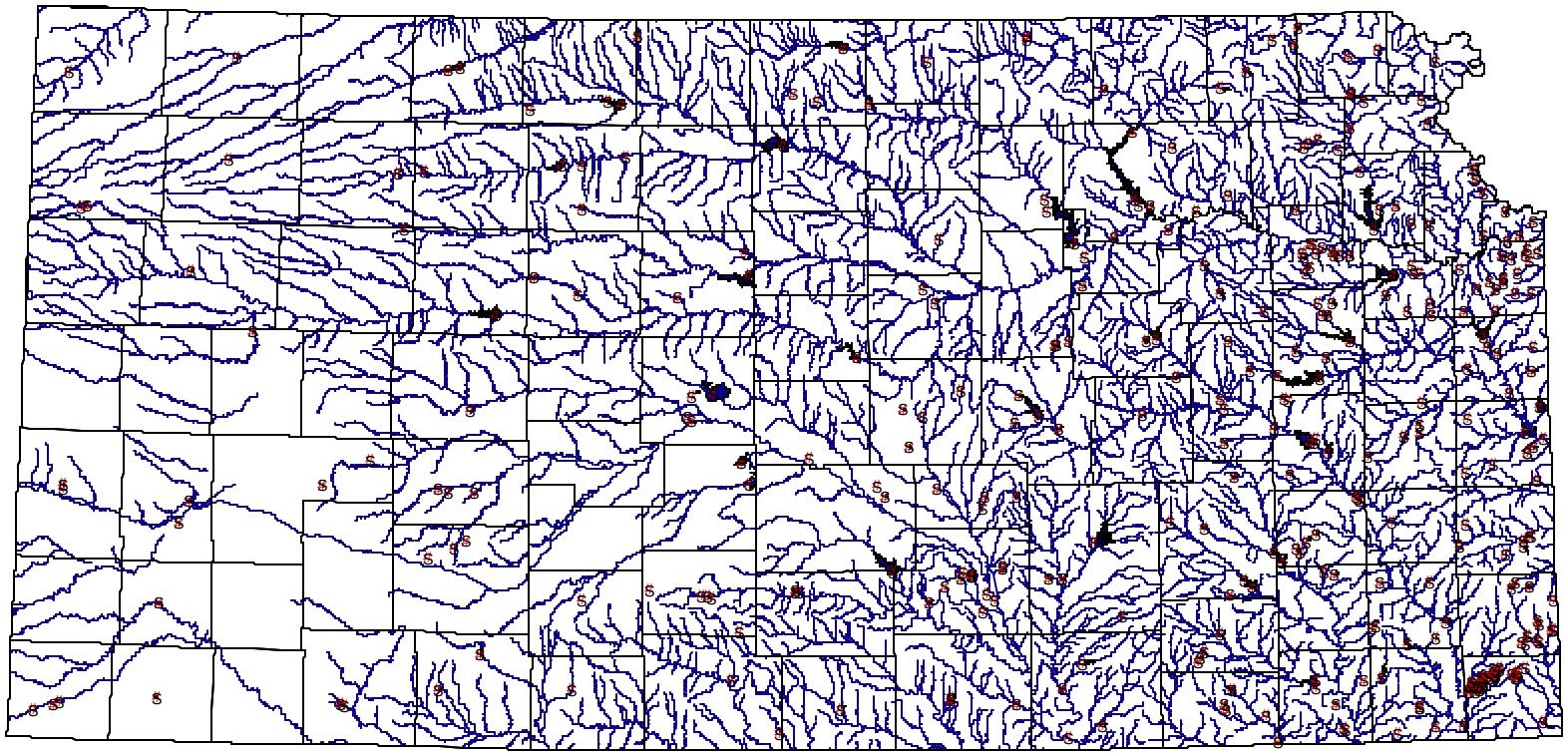
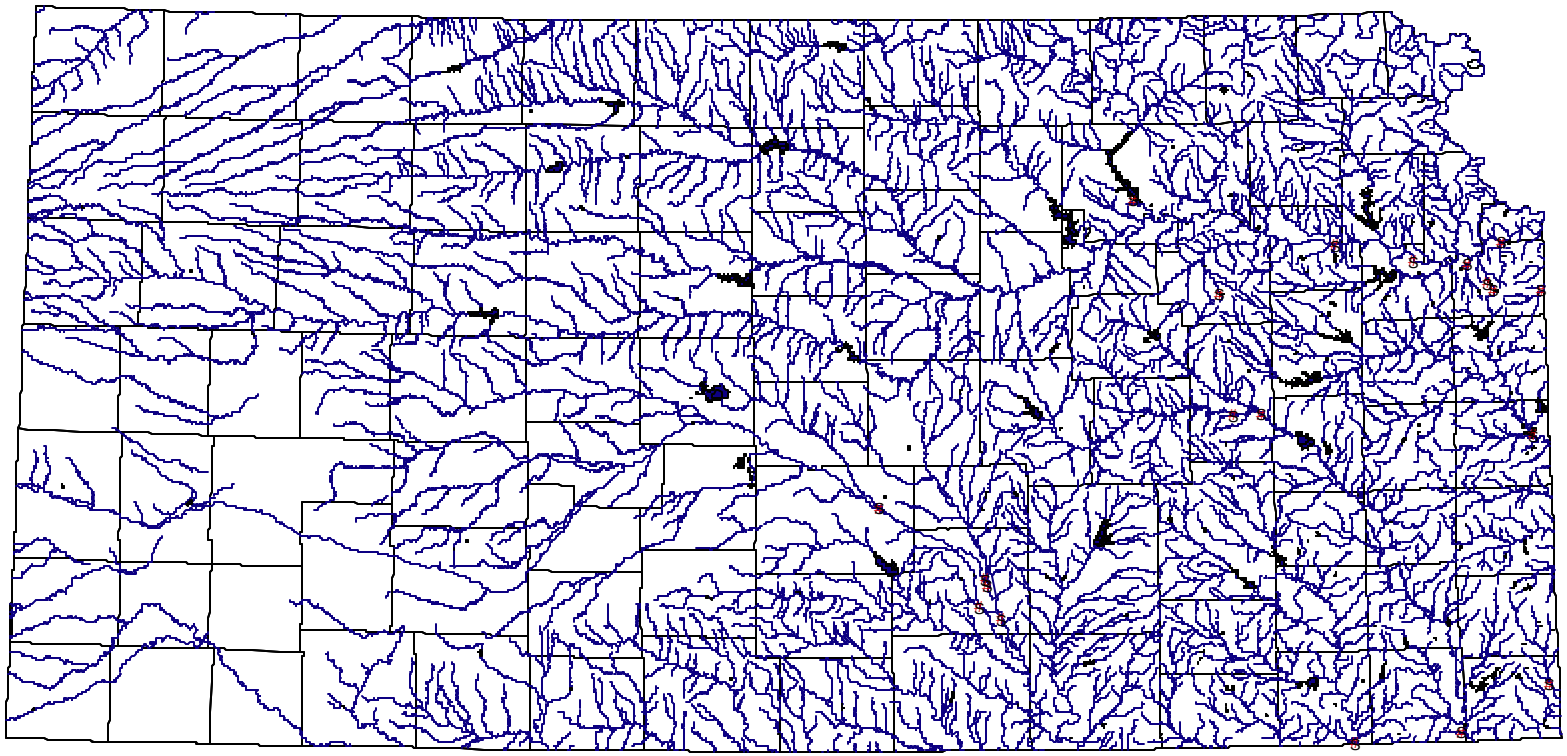
## FIGURE 3. LAKE AND WETLAND MONITORING NETWORK 1995 - 1999



## FIGURE 4. FISH TISSUE MONITORING NETWORK
## 1997 - 1998



## FIGURE 5. GROUNDWATER MONITORING NETWORK

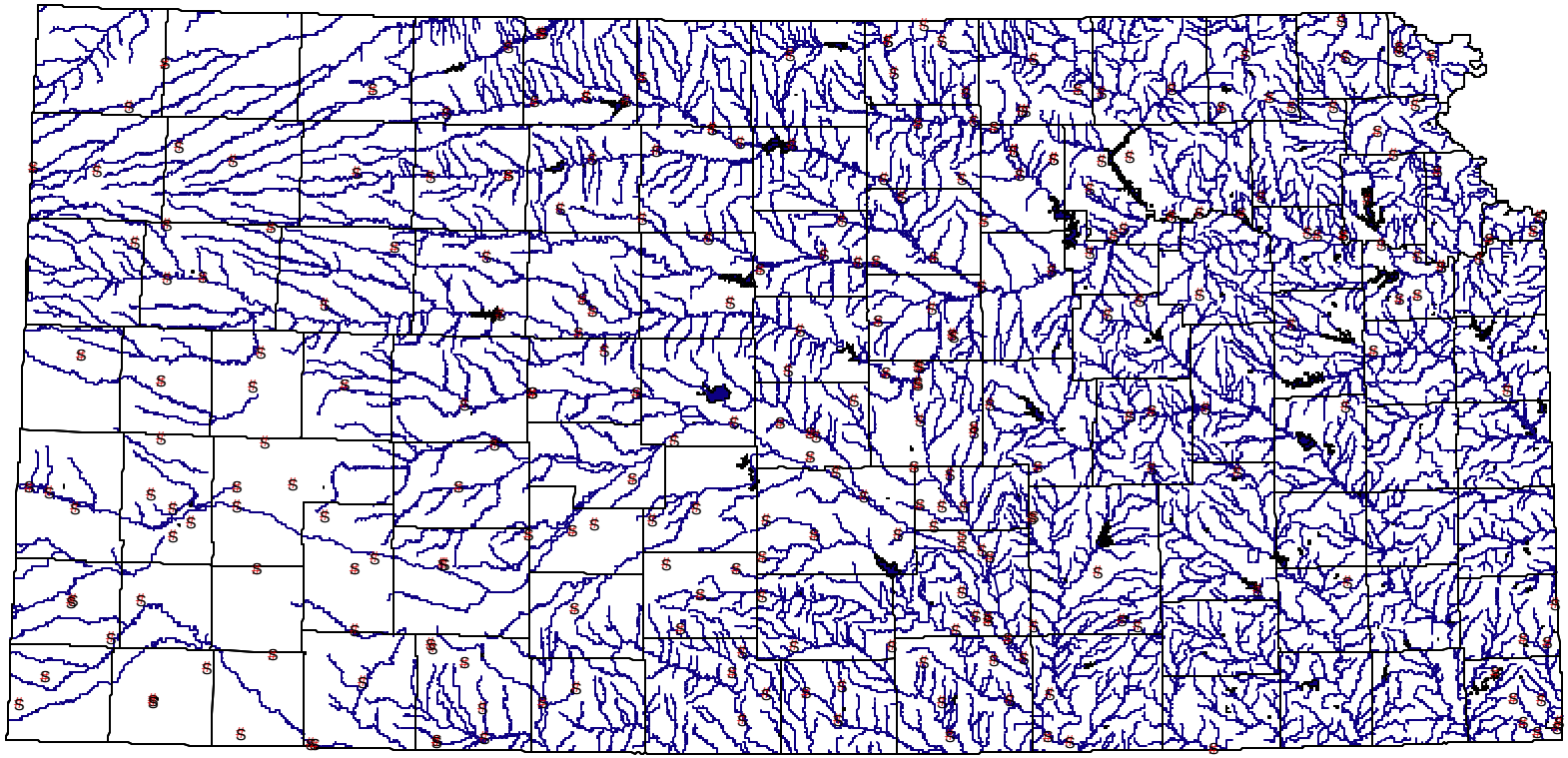


**Table 6a. Summary of Fully Supporting, Threatened, and Impaired Streams Miles**

| DEGREE OF USE SUPPORT | ASSESSMENT CATEGORY | | TOTAL ASSESSED SIZE (MILES) |
|---|---|---|---|
| | EVALUATED | MONITORED | |
| Size Fully Supporting All Assessed Uses | 0 | 3,417 | 3,417 |
| Size Fully Supporting All Assessed Uses but Threatened for at Least One Use | 0 | 0 | 0 |
| Size Impaired for One or More Uses | 0 | 14,819 | 14,819 |
| TOTAL ASSESSED | 0 | 18,236 | 18,236 |

**Table 6b. Summary of Fully Supporting, Threatened, and Impaired Lakes** (in acres)

| DEGREE OF USE SUPPORT | ASSESSMENT CATEGORY | | TOTAL ASSESSED ACRES |
|---|---|---|---|
| | EVALUATED | MONITORED | |
| Fully supporting all uses | 0 | 0 | 0 |
| Supporting but threatened for at least one use | 8,255 | 18,625 | 26,884 |
| Size impaired for one or more uses | 4,797 | 156,825 | 161,622 |
| Total size assessed | 13,052 | 175,454 | 188,506 |

**Table 7a. Individual Use Support Summary for Streams** (in miles)

| GOALS | USE | SIZE ASSESSED | SIZE FULLY SUPPORTING | SIZE FULLY SUPPORTING BUT THREATENED | SIZE PARTIALLY SUPPORTING | SIZE NOT SUPPORTING | SIZE NOT ATTAINABLE |
|---|---|---|---|---|---|---|---|
| PROTECT AND ENHANCE ECOSYSTEMS | Aquatic Life (acute only) | 18,202 | 11,696 | 33 | 3,731 | 2,740 | 0 |
| PROTECT AND ENHANCE PUBLIC HEALTH | Fish Consumption | 271 | 92 | 0 | 0 | 179 | 0 |
| | Shell fishing | * | * | * | * | * | * |
| | Swimming | * | * | * | * | * | 1,697 |
| | Secondary Contact | 18,156 | 6,733 | 0 | 7,319 | 4,104 | 0 |
| | Domestic Water Supply | 7,684 | 4,829 | 0 | 344 | 2,510 | * |
| SOCIAL AND ECONOMIC | Agricultural** | * | * | * | * | * | * |
| | Cultural or Ceremonial | * | * | * | * | * | * |
| | State Defined | | | | | | |
| | 1. Irrigation | 7,498 | 7,095 | 0 | 82 | 321 | * |
| | 2. Livestock | 7,612 | 7,315 | 0 | 31 | 266 | * |
| CUMULATIVE MILEAGE | | 59,423 | 37,760 | 33 | 11,507 | 10,120 | 1,697 |

* = category not applicable
0 = category applicable but size of waters in category is zero
** = see state defined below

**Table 7b. Individual Use Support Summary for Lakes** (in acres)

| GOALS | USE | SIZE ASSESSED | SIZE FULLY SUPPORTING BUT THREATENED | SIZE PARTIALLY SUPPORTING | SIZE NOT SUPPORTING | SIZE NOT ATTAINABLE |
|---|---|---|---|---|---|---|
| Protect & Enhance Ecosystems | Aquatic Life (acute criteria only) | 188,506 | 99,079 | 64,031 | 25,396 | 0 |
| Protect & Enhance Public Health | Fish Consumption | 13,684 | 13,683 | 0 | 1 | 0 |
| | Shellfishing | * | * | * | * | * |
| | Swimming | 188,506 | 47,903 | 107,524 | 33,079 | 0 |
| | Secondary Contact | 188,506 | 105,987 | 79,176 | 3,343 | 0 |
| | Domestic Water Supply | 188,506 | 38,531 | 65,109 | 84,866 | - |
| Social & Economic Enhancement | Agricultural (irrigation) | 188,506 | 106,409 | 78,941 | 3,156 | - |
| | Agricultural (livestock) | 188,506 | 106,131 | 78,901 | 5,474 | - |
| | Cultural | * | * | * | * | * |

* = category not applicable 0 = category applicable, but size of waters in category is zero
- = category applicable, no data available

**TABLE 8a. Total Stream Mileage Impaired by Various Cause/Stressor Categories**

| Cause/Stressor Category | Size of Waters by Contribution to Impairment in Miles | |
|---|---|---|
| | Major[1] | Moderate/Minor[2] |
| Cause/Stressor unknown | * | * |
| Unknown toxicity | * | * |
| Pesticides | * | * |
| Priority organics | * | * |
| Nonpriority organics | * | * |
| Metals | 1,397 | 175 |
| Ammonia | 0 | 8 |
| Cyanide | * | * |
| Sulfates | 2,168 | 344 |
| Chlorine | * | * |
| Other inorganics | 154 | 147 |
| Nutrients | 15 | 170 |
| pH | 266 | 570 |
| Siltation | 17 | 212 |
| Organic enrichment/low DO | 385 | 2,258 |
| Salinity/TDS/chlorides | 1,626 | 746 |
| Thermal modifications | * | 729 |
| Flow alterations | * | * |
| Other habitat alterations | * | * |
| Pathogen indicators | 4,105 | 7,318 |
| Radiation | * | * |
| Oil and grease | * | * |
| Taste and odor | * | * |
| Suspended solids | * | * |
| Noxious aquatic plants (macrophytes) | * | * |
| Total toxics | * | * |
| Turbidity | * | * |
| Exotic species | * | * |
| Excessive algal growth | 0 | 59 |
| Inappropriate littoral vegetation | * | * |

| | | |
|---|---|---|
| Other (specify) | * | * |

* = category not applicable

[1] = indicates nonsupport for designated use
[2] = indicates partial support for designated use

## Table 8b. Total Lake Acres Impaired by Various Cause Categories

| CAUSE CATEGORY | ACRES BY CONTRIBUTION TO IMPAIRMENT | |
|---|---|---|
| | MAJOR | MODERATE/MINOR |
| Cause unknown | 0 | 0 |
| Unknown toxicity | - | - |
| Pesticides | 496 | 14,857 |
| Priority organics | - | - |
| Nonpriority organics | - | - |
| Metals | 0 | 18,183 |
| Ammonia | - | - |
| Chlorine | - | - |
| Other inorganics (fluoride) | 11 | 273 |
| Nutrients/eutrophication | 26,393 | 135,877 |
| pH | 50 | 15816 |
| Siltation | * | * |
| Organic enrichment/low DO | 7 | 11,117 |
| Salinity/TDS/chlorides | 9,291 | 23,264 |
| Thermal modifications | - | - |
| Flow alterations | 396 | 16,449 |
| Other habitat alterations | - | - |
| Pathogen indicators | 0 | 592 |
| Radiation | - | - |
| Oil and grease | - | - |
| Taste and odor** | 20,762 | ?** |
| Suspended solids | 42,018 | 9,764 |
| Noxious aquatic plants | 370 | 2,034 |
| Total toxics | - | - |
| Turbidity | 42,018 | 9,764 |
| Exotic species | - | - |
| Other (specify) | - | - |

- = Category applicable, no data available.

* = Statewide problem, no direct measurements available
** = Reflects problems severe enough to request KDHE assistance. Other incidents are unreported.

**TABLE 9a. Total Stream Mileage Impaired by Various Source Categories**

| Source Category | Contribution to Impairment | |
|---|---|---|
| | Major[1] | Moderate/Minor[2] |
| Industrial Point Sources | 350 | 194 |
| Municipal Point Sources | 2,467 | 2,469 |
| Combined Sewer Overflows | 67 | 28 |
| Collection System Failure | 31 | 8 |
| Domestic Wastewater Lagoon | * | * |
| Agriculture | 6,648 | 6,562 |
| Crop-related sources | 3,101 | 672 |
| Grazing-related sources | 3,629 | 5,720 |
| Intensive Animal Feeding Operations | 3,676 | 6,853 |
| Silviculture | * | * |
| Construction | 91 | 55.5 |
| Urban Runoff/Storm Sewers | 774 | 521 |
| Resource Extraction | 1,751 | 356 |
| Land Disposal | 332 | 244 |
| Hydromodification | 1,127 | 45 |
| Habitat Modification (non-hydromod) | 2,480 | 3,485 |
| Marinas and Recreational Boating | * | * |
| Erosion from Derelict Land | * | * |
| Atmospheric Deposition | * | * |
| Waste Storage/Storage Tank Leaks | * | * |
| Leaking Underground Storage Tanks | * | * |
| Highway Maintenance and Runoff | 138 | 0 |
| Spills (Accidental) | 0 | 24 |
| Contaminated Sediments | 81 | 0 |
| Debris and Bottom Deposits | * | * |
| Internal Nutrient Cycling (primarily lakes) | * | * |
| Sediment Resuspension | * | * |
| Natural Sources | 3,375 | 2,774 |
| Recreational and Tourism Activities | * | * |
| Salt Storage Sites | 83 | 0 |
| Groundwater Loadings | * | * |
| Groundwater Withdrawal | 2,152 | 358 |
| Other | 12 | 0 |
| Unknown Source | 201 | 0 |

| | | |
|---|---|---|
| Sources Outside State Jurisdiction/borders | 326 | 361 |

* = category not applicable [1] = indicates nonsupport for designated use[2] = indicates partial support for designated use

**Table 9b. Total Lake Acres Impaired by Various Source Categories**

| SOURCE CATEGORY | CONTRIBUTION TO IMPAIRMENT | |
|---|---|---|
| | MAJOR | MODERATE/MINOR |
| Industrial Point Sources | - | - |
| Municipal Point Sources | 30,207 | 115,539 |
| Combined Sewer Overflows | - | - |
| Agriculture | 54,206 | 94,940 |
| Silviculture | - | - |
| Construction | - | - |
| Urban Runoff/Storm Sewers | 288 | 6,495 |
| Resource Extraction | 985 | 1,052 |
| Land Disposals | - | - |
| Hydromodification | 3,445 | 22,457 |
| Habitat Modification | - | - |
| Marinas | - | - |
| Atmospheric Deposition | - | - |
| Contaminated Sediments | - | - |
| Unknown Source | 0 | 0 |
| Natural Sources* | 18,998* | 31,196* |
| Other (specify) | - | - |

- = Category applicable, no data available.

* = Refers mainly to in-lake ecophysiological processes (processes secondary to eutrophication, for instance), wind resuspension phenomena, and climate variations, with very little actual background pollution loading from watersheds included.

**Table 10. Trophic Status of Lakes Assessed During This Reporting Cycle (Percent of total in parentheses)**

| TROPHIC STATUS | NUMBER OF LAKES | ACREAGE OF LAKES |
|---|---|---|
| Argillotrophic | 8 (2.5) | 50,018 (26.5) |
| Oligo-Mesotrophic | 7 (2.2) | 350 (0.2) |
| Mesotrophic | 28 (8.8) | 11,365 (6.0) |
| Slightly Eutrophic | 47 (14.8) | 28,666 (15.2) |
| Fully Eutrophic (Eutrophic) | 50 (15.8) | 57,471 (30.5) |
| Very Eutrophic | 34 (10.7) | 21,000 (11.1) |
| Low Hypereutrophic | 39 (12.3) | 8,736 (4.6) |
| High Hypereutrophic | 34 (10.7) | 1,840 (1.0) |
| Dystrophic | 0 | 0 |
| Unknown | 70 (22.2) | 9,060 (4.9) |
| Total | 317 (100.0) | 188,506 (100.0) |

**Table 11. Trophic State Trends in Lakes (% of total in parentheses)**

| CATEGORY | NUMBER OF LAKES | ACREAGE OF LAKES |
|---|---|---|
| Assessed for Trends | 317 (100%) | 188,506 (100%) |
| Improving | 9 (2.8%) | 22,362 (11.9%) |
| Stable | 84 (26.5%) | 100,210 (53.2%) |
| Degrading | 33 (10.4%) | 51,290 (27.2%) |
| Trend Unknown | 191 (60.3%) | 14,644 (7.7%) |

**Table 12. Summary of Domestic Water Supply Use Impairments in Streams**

| **Total Stream Mileage Designated for Use:** 7,684<br>**Total Stream Mileage Assessed for Use:** 18,236 | | | |
|---|---|---|---|
| | **Miles** | **Percent** | **Major Causes** |
| **Fully Supporting Use** | 4,829 | 63 | |
| **Fully Supporting Use but Threatened** | * | * | |
| **Partially Supporting Use** | 344 | 4 | |
| **Not Supporting Use** | 2,510 | 33 | sulfate<br>chloride<br>nitrate |
| **Total Assessed for Use** | 7,684 | 100 | |

* not applicable

**Table 13. Summary of Domestic Water Supply Use Impairments in Lakes**

| **Total Waterbody Area Designated For Use: 149,835 acres (79% of Assessed Acres)**<br>**Total Waterbody Area Assessed For Use: 188,506 acres** | | | |
|---|---|---|---|
| | **Acres** | **Percent** | **Major Causes** |
| **Fully Supporting Use** | 0<br>(0) | 0<br>(0) | |
| **Fully Supporting Use but Threatened** | 33,864<br>(38,531) | 23<br>(20) | |
| **Partially Supporting Use** | 55,411<br>(65,109) | 37<br>(35) | Eutrophication<br>Chloride<br>Sulfate |

| **Total Waterbody Area Designated For Use: 149,835 acres (79% of Assessed Acres)**<br>**Total Waterbody Area Assessed For Use: 188,506 acres** | | | |
|---|---|---|---|
| **Not Supporting Use** | 60,560<br>(84,866) | 40<br>(45) | Eutrophication<br>Atrazine<br>Chloride<br>Sulfate |
| **Total Assessed For Use** | 149,835<br>(188,506) | 100<br>(100) | |

## PART IV: GROUNDWATER

A statewide, EPA approved, Wellhead Protection Program (WHPP) is now fully established and is rapidly gaining momentum. A number of Kansas counties and communities are in the process of developing local WHPP plans. The City of Hays has implemented a local WHPP.

There are no significant changes since the previous 1998 305(b) Report with the following exception: the Kansas Groundwater Quality Monitoring Network was reviewed, reorganized, and streamlined. The following outlines the primary changes to the statewide ambient groundwater program:

1) In 1998, field sampling was suspended during the reorganization.
2) Adapted a newer "Major Kansas Aquifers Map" in digital format originally developed by the KGS and USGS.
3) A total of 65 wells were dropped from the network due to not being within a major aquifer.
4) A total of 28 up-gradient monitoring wells from other KDHE regulatory programs were added to supplement and enhance the network.
5) Assess and report on the program's findings on an aquifer basis and a six year reporting cycle.

Summary tables, although not required, have been provided as follows:

Table 14. Summary of State Groundwater Protection Programs
Table 15. Major Sources of Groundwater Contamination
Table 16. Groundwater Contamination Summary
Table 17. Aquifer Monitoring Data

**Table 14. Summary of State Groundwater Protection Programs**

| Programs or Activities | Check (X) | Implementation Status | Responsible State Agency |
|---|---|---|---|
| Active SARA Title III program | X | fully established | KDHE* |
| Ambient groundwater monitoring | X | fully established | KDHE |
| Aquifer vulnerability assessment | X | on going | KDHE* |
| Aquifer mapping | X | fully established | KGS |
| Aquifer characterization | X | on going | KGS |
| Comprehensive data management | X | | |
| EPA-endorsed Core Comprehensive State Groundwater Protection Program | X | under review | KDHE |
| Groundwater discharge permits | X | fully established | KDHE |
| Groundwater Best Management Practices | X | fully established | KDHE |
| Groundwater legislation | X | | |
| Groundwater classification | X | | |
| Groundwater quality standards | X | not established | KDHE |
| Interagency coordination for groundwater protection initiatives | X | | |
| NPS controls | X | fully established | KDHE* |
| Pesticide State Management Plan | X | under revision | KDA |
| Pollution Prevention Program | X | fully established | KDHE |
| RCRA Primacy | X | fully established | KDHE |
| State Superfund | X | fully established | KDHE |
| State RCRA with more stringent requirements than RCRA Primacy | X | fully established | KDHE |
| State septic system regulations | X | fully established | KDHE |
| Underground Storage Tank (UST) installation requirements | X | fully established | KDHE |
| UST Remediation Fund | X | fully established | KDHE |
| UST Permit Program | X | fully established | KDHE |
| Underground Injection Control Program | X | fully established | KCC & KDHE |
| Vulnerability assessment for drinking water/wellhead protection | X | EPA approved plan implementation proceeding | KDHE |
| Well abandonment regulations | X | fully established | KDHE |
| Wellhead Protection Program (EPA-approved) | X | fully established | KDHE |
| Well installation regulations | X | fully established | KDHE |

*principal administrative agency

**Table 15. Major Sources of Groundwater Contamination**

| Ten Highest Priority Contaminant Sources | Factors Considered in Selecting a Contaminant Source | Types of Contaminants |
|---|---|---|
| **AGRICULTURAL ACTIVITIES:** | | |
| Ag. chemical facilities/applications | D,A,C | E,B,C |
| Animal feedlots | D,A,C | J,E |
| **STORAGE AND TREATMENT:** | | |
| Storage tanks (AST/LUST) | D,B,A,C | D |
| Surface impoundments | E,A | J,E |
| **DISPOSAL ACTIVITIES:** | | |
| Landfills/illegal dumping | E,C,A | H |
| **OTHER:** | | |
| Active/abandoned industrial facilities | A,B,C | C,H |
| Oil and gas activities | D,A,B,C | D,G |
| Pipelines and sewer lines | E,A | D,E |
| Salt water intrusion | E,C,B | G |
| Spills | D,A | D,C |

**Factors Considered in Selecting a Contaminant Source:**
(A) Human health and/or environmental risk (toxicity)
(B) Size of population at risk
(C) Location of sources relative to drinking water sources
(D) Number and/or size of contaminant sources
(E) Hydrogeologic sensitivity

**Types of Contaminants:**
(A) Inorganic pesticides
(B) Organic pesticides
(C) Halogenated solvents
(D) Petroleum compounds
(E) Nitrate
(F) Fluoride
(G) Salinity/brine
(H) Metals
(I) Radionuclides
(J) Bacteria
(K) Protozoa
(L) Viruses

**Table16. Groundwater Contamination Summary.** Statewide Cumulative Summary Through December 31, 1999

| Source Type | # of Kansas Sites | # of Sites with Confirmed Releases | # with Confirmed Groundwater Contamination | Primary Contaminants | # of Site Assess-ments | # of Sites with Source Removed | # of Sites with CAPs | # of Sites with Active Remediation | # of Sites with Cleanup Resolved |
|---|---|---|---|---|---|---|---|---|---|
| **NPL** | 13 | 13 | 13 | VOCs, metals | 13 | unavailable | 1 | 7 | 5 |
| **CERCLIS (non-NPL)** | 498 | 498 | 498 | VOCs, metals & pesticides | 498 | unavailable | unavailable | 118 | 71 |
| **DOD/DOE** | 27 | 27 | 27 | VOCs, metals | 27 | unavailable | unavailable | 6 | 1 |
| **LUST** | 8,700 | 4,300 | approx 2,100 | gasoline and diesel fuels | 8,700 | 3,700 | unavailable | 2,200 | 2,300 |
| **RCRA Corrective Action** | under EPA control | | | | | | | | |
| **Underground Injection *** | 40 | 0 | 0 | none | 0 | 0 | 0 | 0 | 0 |
| **State Sites **** | 471 | 471 | 471 | VOCs, metals | 471 | unavailable | unavailable | 112 | 70 |
| **NPS** | unknown | | | | | | | | |

CAPs - Corrective Action Plans
CERCLIS - Comprehensive Environmental Response, Compensation, and Liability Information System
DOD/DOE - Department of Defense/Department of Energy
LUST - Leaking Underground Storage Tanks
NPL - National Priority List
NPS - Non Point Source
RCRA - Resource Conservation and Recovery Act
* Represents Class I and III injection wells and hydrocarbon storage sites, but does not include Class II brine injection wells.
** Numbers do not include sites under KCC jurisdiction or LUST sites.
NOTE: This table includes only sites with groundwater contamination (the last report inadvertently listed all contamination sites).

**Table17. Aquifer Monitoring Data**
Statewide summary for the period of 1997 and 1999[1]

| Monitoring Data Type | Total # of Well Samples in the Assessment | Parameter Groups | Parameters Not Detected or Nitrate #5 mg/L | Parameters Detected or Nitrate >5 to #10 mg/L | Parameters Exceeding the MCLs | Removed From Service | Special Treat-ment | Background Parameters Exceeding MCLs |
|---|---|---|---|---|---|---|---|---|
| **Ambient Groundwater Quality Monitoring Network** | 44 | VOCs | 33 | 11 | 0 | | | |
| | 217 | Pesticides | 204 | 13 | 0 | | | |
| | 217 | Nitrate | 140 | 61 | 16 | | | |
| | 217 | Fluoride | 2 | 214 | 1 | | | 1 |
| | 217 | Selenium | 82 | 132 | 3 | | | 3 |
| | 43 | Radio- | 0 | 42 | 1 | | | 1 |

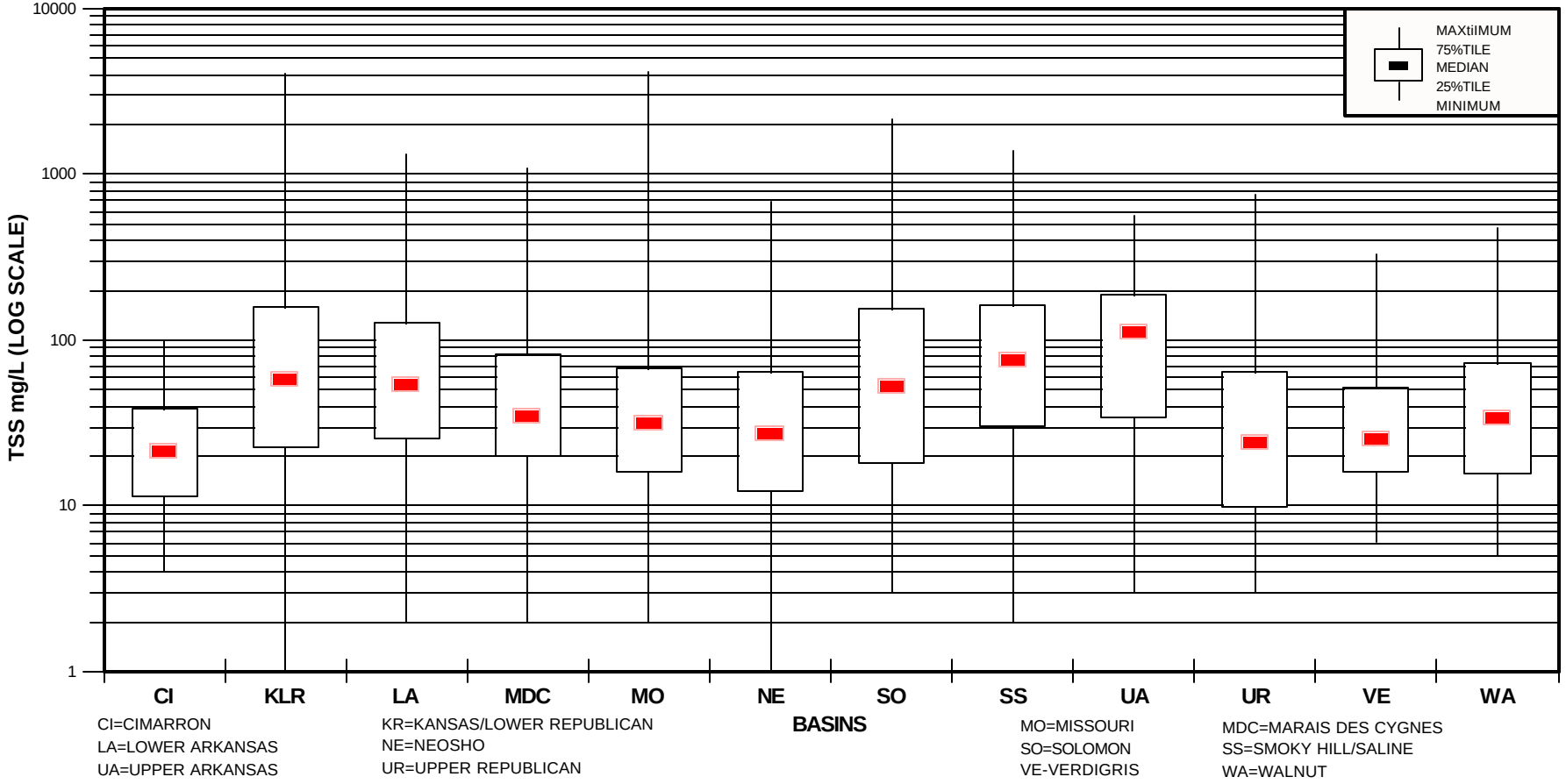
NOTES: (1) No samples were collected during the 1998 calendar year due to program reorganization.
(2) Some wells were sampled more than once during the reporting period (1997 and 1999).
(3) All data obtained from the Kansas Groundwater Quality Monitoring Network only.
(4) Only parameters with federal drinking water MCLs were included in this summary.
(5) Some of the contaminated wells are presently used for monitoring purposes only.
(6) Groundwater monitoring network samples were collected after well purging and prior to treatment.

**Table 17. Aquifer Monitoring Data (continued)**
Statewide summary for the period of 1998-1999

| Monitoring Data Type | Total # of Samples in the Assessment | Parameter Groups | Parameters Not Detected or Nitrate #5 mg/L | Parameters Detected or Nitrate >5 to #10 mg/L | Parameters Exceeding the MCLs | Removed From Service | Special Treat-ment | Background Parameters Exceeding MCLs |
|---|---|---|---|---|---|---|---|---|
| **Finished Water Quality Data From Public Water Supply Wells** | 37,754 | VOCs | 36,614 | 1,125 | 15 | | | |
| | 2,762 | SOCs | 91 | 286 | 11 | | | |
| | 876 | Ethylene Dibromide | 840 | 36 | 0 | | | |
| | 78 | Fluoride | 1 | 77 | 0 | | | |
| | 75 | Mercury | 70 | 5 | 0 | | | |
| | 2,599 | Nitrate | 1,611 | 732 | 256 | | | |
| | 128 | Selenium | 3 | 82 | 43 | | | 43 |

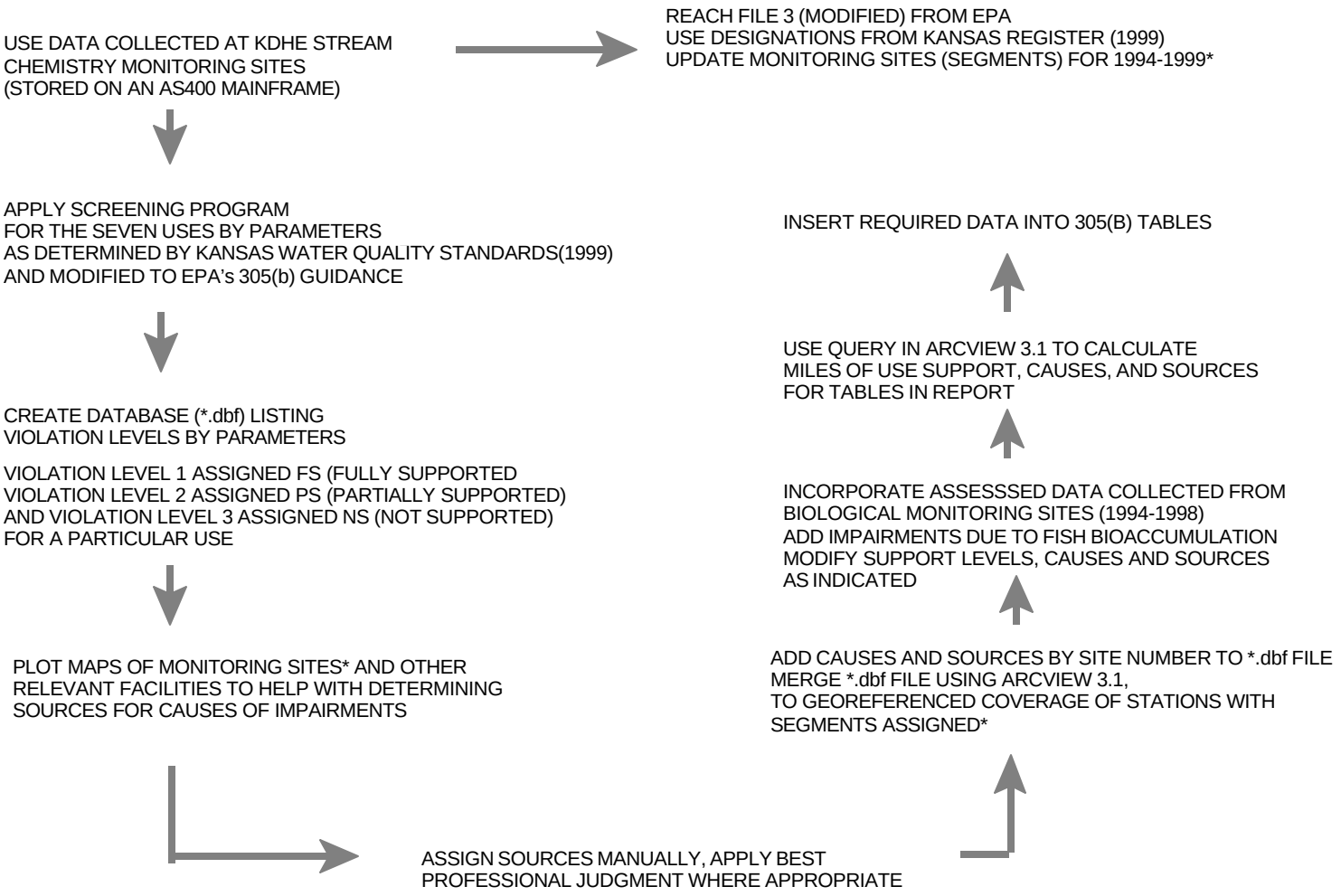
NOTES: (1) Some wells were sampled more than once during the reporting period (1998-1999).
(2) All data obtained from compliance monitoring of public water supply systems.
(3) Only parameters with federal drinking water MCLs were included in this summary.
(4) Does not include data analyzed by private laboratories (this data is not yet computerized).
(5) Does not include SOC data analyzed using the immunoassay method.
(6) SOC data does not include ethylene dibromide (listed separately).
(7) An individual sample that exceeded a MCL does not necessarily mean that the entire PWS system was out of compliance.

# APPENDIX A
# TSS CONCENTRATIONS IN KANSAS BASINS
1998 - 1999




CI=CIMARRON
LA=LOWER ARKANSAS
UA=UPPER ARKANSAS
KR=KANSAS/LOWER REPUBLICAN
NE=NEOSHO
UR=UPPER REPUBLICAN
MO=MISSOURI
SO=SOLOMON
VE-VERDIGRIS
MDC=MARAIS DES CYGNES
SS=SMOKY HILL/SALINE
WA=WALNUT

# APPENDIX B
# STREAM ASSESSMENT PROTOCOL



# APPENDIX C

## Clean Lakes and Wetlands*

(Only data differing significantly from the previous reporting cycle are provided)

**Summary Statistics**

**Table 1. Categories of Data used in ALUS Assessments for Lakes**

| DEGREE OF ALUS (acute criteria only) | ACRES ASSESSED BASED ON BIOLOGICAL HABITAT DATA ONLY | ACRES ASSESSED BASED ON PHYSICAL/ CHEMICAL DATA ONLY | ACRES ASSESSED BASED ON/ BIOLOGICAL/ CHEMICAL DATA | TOTAL ACRES ASSESSED FOR ALUS |
|---|---|---|---|---|
| Fully supported | 0 | 0 | 0 | 0 |
| Fully supported but threatened | 0 | 0 | 99,079 | 99,079 |
| Partially supported | 0 | 0 | 64,031 | 64,031 |
| Not supported | 0 | 0 | 25,396 | 25,396 |

**Table 2. Lake Acreage With Identifiable Point and Nonpoint Source Pollution Contributions**

| POLLUTION TYPE | NUMBER OF LAKES* | ACRES OF LAKES |
|---|---|---|
| Point Sources | 27 | 145,746 |
| Nonpoint Sources | 250 | 175,793 |
| No Identifiable Pollution Sources | 67 | 12,713 |

*Numbers include any level of point source inputs, and any magnitude or combination of NPSs. Due to the fact that a number of lakes have both source types within their watersheds, the numbers will not necessarily total to the acres/numbers of lakes reported in this chapter.

**Clean Lakes Program**
(Only data differing significantly from the previous reporting cycle are provided)

Background

A total of 317 publicly owned or publicly accessible lakes are included in this reporting cycle. This represents all such lakes known to KDHE through monitoring activities and reports published by other agencies. These lakes comprise 188,506 surface acres.

*some of the data presented here also appears in Part III of this Report

Trophic Status

The majority of lakes fall into the eutrophic and hypereutrophic categories, while the vast majority of surface acreage falls into the argillotrophic and eutrophic categories. This primarily results from the influence that lake size (area, volume, depth) exerts on lake trophic state development. Many of the larger lakes in the state are mesotrophic-to-eutrophic, or suffer from high turbidity, while many of the small lakes in Kansas develop hypereutrophic conditions, based in some part on hydrologic and morphometric influences. While a significant percentage of reported lakes have not been assessed for their trophic status (22.2%), they constitute only about 5% of the total reported acreage. At present, about half of the reported lakes with unknown trophic state conditions are within the Mined Land Lakes (MLL) Recreation Area in southeast Kansas.

**Table 3. Trophic Status of Lakes Assessed During This Reporting Cycle** (Percent of total in parentheses**)**

| TROPHIC STATUS | NUMBER OF LAKES | ACREAGE OF LAKES |
|---|---|---|
| Argillotrophic | 8 (2.5) | 50,018 (26.5) |
| Oligo-Mesotrophic | 7 (2.2) | 350 (0.2) |
| Mesotrophic | 28 (8.8) | 11,365 (6.0) |
| Slightly Eutrophic | 47 (14.8) | 28,666 (15.2) |
| Fully Eutrophic (Eutrophic) | 50 (15.8) | 57,471 (30.5) |
| Very Eutrophic | 34 (10.7) | 21,000 (11.1) |
| Low Hypereutrophic | 39 (12.3) | 8,736 (4.6) |
| High Hypereutrophic | 34 (10.7) | 1,840 (1.0) |
| Dystrophic | 0 | 0 |
| Unknown | 70 (22.2) | 9,060 (4.9) |
| Total | 317 (100.0) | 188,506 (100.0) |

Control Methods

(No new data to report)

Restoration/Rehabilitation Efforts

(No new data to report)

Impaired and Threatened Lakes

Table 4 summarizes overall use support ratings for lakes assessed during this reporting cycle.

Impairments related to chronic aquatic life support criteria were not included in the analysis, except as mentioned previously. Support rating for individual designated uses for lakes is presented in Table 5.

**Table 4. Summary of Fully Supporting, Threatened, and Impaired Lakes**

| DEGREE OF USE SUPPORT | ASSESSMENT CATEGORY | | TOTAL ASSESSED ACRES |
|---|---|---|---|
| | EVALUATED | MONITORED | |
| Fully supporting all uses | 0 | 0 | 0 |
| Supporting but threatened for at least one use | 8,255 | 18,629 | 26,884 |
| Size impaired for one or more uses | 4,797 | 156,825 | 161,622 |
| Total size assessed | 13,052 | 175,454 | 188,506 |

All monitored lakes have data for a range of heavy metals and pesticides, including a number of those substances defined as “toxics” by the EPA. Out of the total reported acreage (188,506 acres) 175,454 acres are surveyed for total recoverable metals and pesticides (93.1% of the total). Of the total acres assessed for toxics, 33,436 acres (18% of total) demonstrated some level of impairment or exceedence due to metals or pesticides. Table 6 shows assessment data pertaining to the causes of use impairments in lakes in Kansas while Table 7 lists contaminant sources responsible for lake use impairments.

**Table 5. Individual Use Summary in Acres for Lakes**

| GOALS | USE | SIZE ASSESSED | SIZE FULLY SUPPORTING BUT THREATENED | SIZE PARTIALLY SUPPORTING | SIZE NOT SUPPORTING | SIZE NOT ATTAINABLE |
|---|---|---|---|---|---|---|
| Protect & Enhance Ecosystems | Aquatic Life (acute criteria only) | 188,506 | 99,079 | 64,031 | 25,396 | 0 |
| Protect & Enhance Public Health | Fish Consumption | 13,684 | 13,683 | 0 | 1 | 0 |
| | Shellfishing | * | * | * | * | * |
| | Swimming | 188,506 | 47,903 | 107,524 | 33,079 | 0 |
| | Secondary Contact | 188,506 | 105,987 | 79,176 | 3,343 | 0 |
| | Domestic Water Supply | 188,506 | 38,531 | 65,109 | 84,866 | - |
| Social & Economic Enhancement | Agricultural (irrigation) | 188,506 | 106,409 | 78,941 | 3,156 | - |
| | Agricultural (livestock) | 188,506 | 106,131 | 78,901 | 5,474 | - |
| | Cultural | * | * | * | * | * |

* = category not applicable

0 = category applicable, but size of waters in category is zero

\- = category applicable, no data available

Acid Effects on Lakes

A total of 188,506 acres of lakes in Kansas were monitored or evaluated for pH, out of the total reported during this cycle. This combines the KDHE Lake and Wetland Monitoring Program sites, Lake Water Quality Assessment (LWQA) survey sites, and an additional 1,150 acres within the Mined Land Lakes Area in southeast Kansas. These additional 1,150 acres were part of a special study (funded by Clean Lakes Program LWQA money) to look specifically for low pH problems. In all, >99% of reported lake acres were assessed for pH (100% of monitored lake acres).

A total of 15,793 lake acres are impacted by high pH during the 1995-1999 reporting period. In all cases, high summer time pH incidents are related to periods of intense phytoplankton or macrophytic productivity. A total of 73 acres of lakes were impacted by low pH during the 1995-1999 reporting period. In these cases, low pH is due to the lingering impacts of past coal mining activity.

## Table 6. Total Lake Acres Impacted by Various Cause Categories

| CAUSE CATEGORY | ACRES BY CONTRIBUTION TO IMPAIRMENT | |
|---|---|---|
| | MAJOR | MODERATE/MINOR |
| Cause unknown | 0 | 0 |
| Unknown toxicity | - | - |
| Pesticides | 496 | 14,857 |
| Priority organics | - | - |
| Nonpriority organics | - | - |
| Metals | 0 | 18,183 |
| Ammonia | - | - |
| Chlorine | - | - |
| Other inorganics (fluoride) | 11 | 273 |
| Nutrients/eutrophication | 26,393 | 135,877 |
| pH | 50 | 15816 |
| Siltation | * | * |
| Organic enrichment/low DO | 7 | 11,117 |
| Salinity/TDS/chlorides | 9,291 | 23,264 |
| Thermal modifications | - | - |
| Flow alterations | 396 | 16,449 |
| Other habitat alterations | - | - |
| Pathogen indicators | 0 | 592 |
| Radiation | - | - |
| Oil and grease | - | - |
| Taste and odor** | 20,762 | ?** |
| Suspended solids | 42,018 | 9,764 |
| Noxious aquatic plants | 370 | 2,034 |
| Total toxics | - | - |
| Turbidity | 42,018 | 9,764 |
| Exotic species | - | - |
| Other (specify) | - | - |

- = Category applicable, no data available.

* = Statewide problem, no direct measurements available
** = Reflects problems severe enough to request KDHE assistance. Other incidents are unreported.

**Table 7. Total Lake Acres Impaired by Various Source Categories**

| SOURCE CATEGORY | CONTRIBUTION TO IMPAIRMENT | |
|---|---|---|
| | MAJOR | MODERATE/MINOR |
| Industrial Point Sources | - | - |
| Municipal Point Sources | 30,207 | 115,539 |
| Combined Sewer Overflows | - | - |
| Agriculture | 54,206 | 94,940 |
| Silviculture | - | - |
| Construction | - | - |
| Urban Runoff/Storm Sewers | 288 | 6,495 |
| Resource Extraction | 985 | 1,052 |
| Land Disposals | - | - |
| Hydromodification | 3,445 | 22,457 |
| Habitat Modification | - | - |
| Marinas | - | - |
| Atmospheric Deposition | - | - |
| Contaminated Sediments | - | - |
| Unknown Source | 0 | 0 |
| Natural Sources* | 18,998* | 31,196* |
| Other (specify) | - | - |

- = Category applicable, no data available.
* = Refers mainly to in-lake ecophysiological processes (processes secondary to eutrophication, for instance), wind resuspension phenomena, and climate variations, with very little actual background pollution loading from watersheds included.

## Trends in Lake Water Quality

Time trends in lake water quality are difficult to determine, given that the chemical data do not lend themselves well to statistical analysis at this time. Trophic state remains the indicator of overall lake water quality for the determination of trends within this report. If a given lake had trophic state assessments for three, or more, occasions during the last twelve years, then a trend of "improving," "degrading," or "stable" was assigned. If no recent trophic state data were available, or if the most recent data were more than eight years old, then a trend classification of "unknown" was assigned. Table 8 presents the lake trophic state trends for this reporting period.

**Table 8. Trophic State Trends in Lakes** (% of total in parentheses)

| CATEGORY | NUMBER OF LAKES | ACREAGE OF LAKES |
|---|---|---|
| Assessed for Trends | 317 (100%) | 188,506 (100%) |
| Improving | 9 (2.8%) | 22,362 (11.9%) |
| Stable | 84 (26.5%) | 100,210 (53.2%) |
| Degrading | 33 (10.4%) | 51,290 (27.2%) |
| Trend Unknown | 191 (60.3%) | 14,644 (7.7%) |

According to the data in Table 8, the majority of lakes are of unknown trophic state trend, but they constitute less than eight percent of the total reported acreage. These are the small lakes that have undergone assessment, but have not been monitored for trophic state over time. Therefore, trends cannot be determined. Of the monitored lake acreage in Kansas, over 50% is stable over time, while slightly less than 30% appear to be degrading over time. Only about 12% of lake acres in the state have shown any appreciable improvement in trophic state condition during this reporting cycle.

## Wetlands Assessment

(Only data differing significantly from the previous reporting cycle are provided)

### Extent of Wetland Resources

(No new data)

### Integrity of Public Wetland Resources

Out of the 35,607 wetland acres (35 wetlands total) assessed during this reporting cycle, 25,069 acres (9 wetlands total) are considered to be monitored sites. This represents 70% of the total acres reported, and 26% of the total number of reported wetlands. An additional 10,538 acres of wetland are reported as evaluated (26 wetlands, 74% of the total).

At a minimum wetlands are designated for secondary contact recreation, food procurement, and aquatic life support uses. Wetlands are not generally designated for other uses in Kansas. Overall aquatic life use support (acute criteria only, with the exceptions of chloride and pesticides) is as follows, in terms of total reported acreage (monitored and/or evaluated sites): 9,124 acres are fully supported but threatened (26%), 2,666 acres are partially supported (7%), and 23,817 acres are not supported (67%). These numbers refer primarily to exceedences of acute aquatic life support criteria, although numbers were not significantly different when chronic criteria were analyzed.

Levels of secondary contact recreational use support are as follows, in terms of reported acreage: 10,119 acres are fully supported but threatened (29%), 7,886 acres are partially supported (22%), and 17,602 acres are not supported (49%).

The major causes of partial and/or nonsupport of designated uses in Kansas' wetlands are excessive nutrient load, heavy metals, salinity, elevated pH, flow alterations, low dissolved oxygen, and turbidity/siltation. The major sources of partial and/or nonsupport of designated uses are agriculture, hydromodifications in watersheds, and natural processes (wetland ecophysiological processes and natural climate variations).

Out of the 25,069 monitored wetland acres in Kansas, 100% are monitored for toxics (heavy metals, pesticides, and ammonia). Due to a special wetland assessment project (discussed further on) a large number of normally evaluated wetlands are being assessed for toxics through the year 2000. During this reporting cycle, 18,454 acres of wetlands were impacted by toxics (52% of reported acres).

During this reporting cycle, 23,847 wetland acres were assessed as hypereutrophic (67%), 1,110 acres were assessed as slightly-to-very eutrophic (3.1%), 31 acres were assessed as mesotrophic (<0.1%), and 9,092 acres were not assessed for trophic state (25.5%). Another 1,500 acres were assessed as argillotrophic (4.3%). Out of the reported wetland acres, trends in trophic status were as follows: 65% were stable over time (23,129 acres), 6.5% were degrading over time (2,315 acres), and trends in 28.5% (10,163 acres) were unknown.

## Development of Wetland Water Quality Standards

(No new data)

## Additional Wetland Protection Activities

(No new data)